ECS-eVISION

Installation and Operating Instructions

An intelligent Energy meter that allows you to keep consumption under control in order to save cost for your house or office

IIST107-01 Stand 30-06-2013

Energy-meters three-phase - Connection through CT .../1 A till 2.000/1 A

Code	Model	Description
ECSEM181	**eVision 3-1 LAN**	three-phase digital energy-meter with connection by CT .../1 A, up to 2.000/1 A - 0.01-1 (1.2) A and in-built communication **LAN - 2 tariff**

Energy-meters three-phase - Connection through CT .../5 A till 10.000/5 A

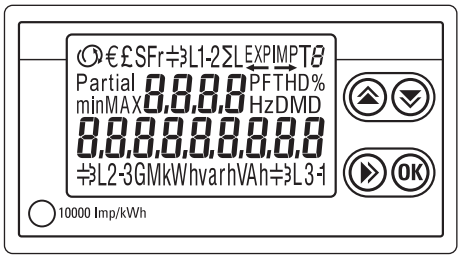
Code	Model	Description
ECSEM172	**eVision 3-5 LAN**	three-phase digital energy-meter with connection by CT .../5 A, up to 10.000/5 A - 0.05-5 (6) A and in-built communication **LAN - 2 tariff**

⚠ WARNING

Installation must be carried out and inspected by a specialist or under his supervision.
When working on the instrument, switch off the mains voltage!

- eVision is an innovative Energy meter that allows the user to know and analyse at all times the flow of Energy consumption of his house or office. Through the collected and visualized information from the embedded web application of eVision, it is possible to optimize the use of the electric Energy choosing the most convenient hour tariff in order to avoid bill wastes. eVision offers a concrete opportunity to reduce the electricity bill and hold down the CO_2 emissions, contributing to a more sustainable future. The investment will be paid back in a very short time. eVision constantly controls the Energy consumption of your household appliances, lights, air conditioner, heaters, swimming pool pumps etc. eVision intelligently controls your Energy consumption visualizing in real time the Energy cost of your house or office, advising you with an e-mail once the set limits are exceeded. Because of the LAN connection, the user can consult eVision wherever he likes; through PC, Smartphone or Tablet. The Internet web access allows you to analyse different informations, for example the instant consumption shown in kWh, or in your currency, visualizing it in a clear and simple graphic. Unlike the other solutions available in the market, eVision is easy to install and to use. The installing procedure do not need any severe interventions on your existing plant and the LAN connection allows to interact in a direct and easy way (Plug & Play).

Display



GMkWhvarhVAh	• Units
Hz	• Frequency
PF	• Power factor
Partial	• Energy value “Partial”
THD%	• Total Harmonic Distortion %
€£SFr	• Currency

8.8.8.8.8.8.8.8.8.8	• Energy value
8.8.8.8	• Energy value
EXP IMP	• Energy import (absorbed →) • Energy export (supplied ←)
T8	• Tarif Running tariff, called tariff
ΣL	• Phase summary line energy
ω	• Displays inductive, reactive power
⊣⊢	• Displays capacitative, reactive power
L1-2	• Line in use (L1 / L1-L2)
L2-3	• Line in use (L2 / L2-L3)
L3-1	• Line in use (L3 / L3-L1)
minMAX	• Minimum / Maximum
DMD	• Demand

Commands

• Menu key for reading selection

• Parameters set

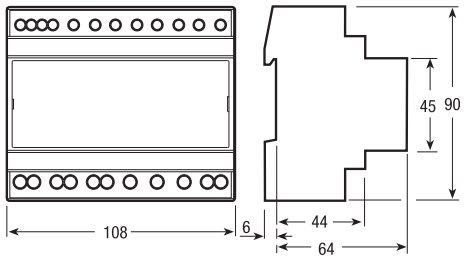
• Command button for “partial” reading selection

Front led

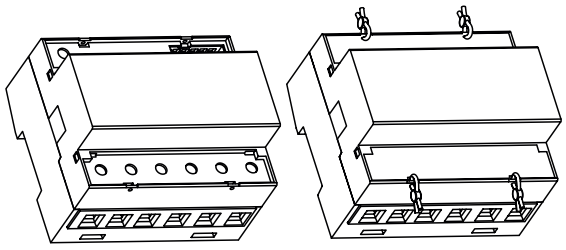
• Precision control LED

Dimension

ECSEM181 - ECSEM172

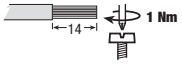


Sealable terminal covers

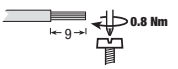


Cable stripping length and max. terminal screw torque

1 A CT connection main terminals - Screw driver PZ1
5 A CT connection main terminals - Screw driver PZ1



Tariff and communication terminals
Screw driver blade 0.8x3.5 mm



Factory LAN Parameters

IP address:	192.168.1.253
Subnet Mask:	255.255.255.0
Gateway:	192.168.0.251
Primary DNS:	62.138.54.100
Secondary DNS:	156.154.70.1

Administrator name and password:
- User name: admin
- Password: admin

Generic user and password:
- User name: user
- Password: user

Symbols

• Measuring elements

• Protected by double insulation

Selection of Main Menu

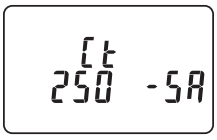
There are three versions of the Main Menu, with different sequences of pages.
By pushing " ⏫ " or " ⏬ " keys it is possible to scroll all the pages.
By pushing the " OK " key when the active energy counters are visible on the display, the unit toggles between kWh and the selected currency (Euro, Pounds, SFrs or generic rate).

During the pages scrolling, a short message appears when the page changes, indicating the page number and the active menu.
For example, if the selected menu is **"C"**, and you push the " ⏫ " key when the 4th page is displayed, the following message shortly appears before the 5th page is displayed.

By pushing the " ⏭ " key for 3 seconds, whichever the displayed page, it is possible to enter into the "Parameters Menu".

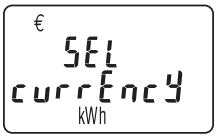
Parameter Menu

Push " ⏫ " or " ⏬ " keys to scroll parameters on the display.
To start the modification, push " OK " key. If the password is enabled (password ON), you are required to enter a push for 4 seconds the " ⏫ " and " ⏬ " keys together.
Once the correct password is applied, the parameter name start to blink.
You can modify the parameter value by means if " ⏫ " or " ⏬ " keys.
Once the modification is finished, you must push " OK " key to confirm the new value, otherwise the modification is ignored.
By pushing the " ⏭ " key for 3 seconds, whichever the parameter page, you go back to the **"Main Menu"**.

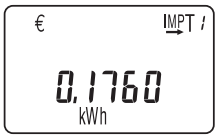


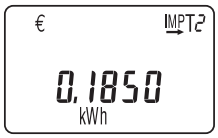
Current at Primary:
Transformer primary nominal current can span from 5 A to 10000 A with step of 5 A in model .../5 A, or from 1 A to 2000 A with step of 1 A in model .../1 A

Values Referred to Primary / Secondary:
On display and through communication, all current, power and energy values be referred to primary or to secondary winding of external CTs.



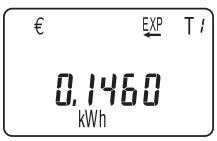
Energy Values Currency:
The active energy values in the main menu pages are expressed in kWh, or in a selectable currency: Euros, Pounds, Swiss Francs or generic rate.
In this page the user can select the currency.
After the currency selection is possible to define the cost of a kWh for the imported and exported active energy on tariff 1 and tariff 2.

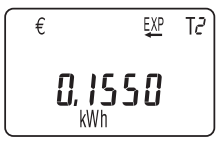




0.176 € per imported kWh on tariff 1

0.185 € per imported kWh on tariff 2

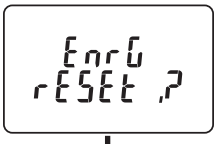




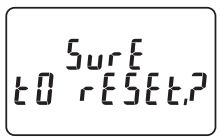
0.146 € per exported kWh on tariff 1

0.155 € per exported kWh on tariff 2

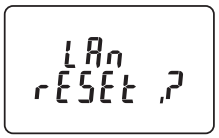
Menu Version Selection:
In this page it is possible to select the Menu Version (**A**, **B** or **C**)



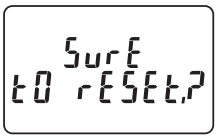
Energy Registers Reset:
By pushing the " OK " key, the user is asked to confirm the decision:



By pushing the " OK " key, the active and reactive energy registers are zeroed.



LAN Parameters Reset (to default values):
It is possible to reset TCP/IP address, all other LAN parameters and user parameters (username, password, ...).
By pushing the " OK " key, the user is asked to confirm the decision:



By pushing the " OK " key, the parameters are reset to their default values.

Password Enabling / Disabling:
In case password is toggled to **"ON"**, the parameters modification are inhibited until the password is correctly entered.

S0 Pulse Output

Pulse output rate depends on CT Ratio

For ... /5 A model:

- 5/5	< CT Ratio	≤ 300/5 A	50 pulse / kWh
- 300/5	< CT Ratio	≤ 3000/5 A	5 pulse / kWh
- 3000/5	< CT Ratio	≤ 10000/5 A	1 pulse / kWh

For ... /1 A model:

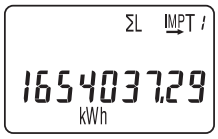
- 1/1	< CT Ratio	≤ 60/1 A	250 pulse / kWh
- 60/1	< CT Ratio	≤ 600/1 A	25 pulse / kWh
- 600/1	< CT Ratio	≤ 2000/5 A	5 pulse / kWh

"Note to Main Menu Pages"

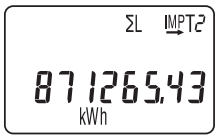
Tariff indication:
In case of Energy pages, the tariff of the accumulated Energy is indicated
In the other pages, the running tariff is indicated

Version A - Main Menu Pages

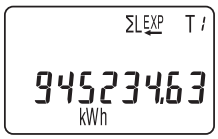
Page 1:
Total Active Imported Energy under T1 tariff



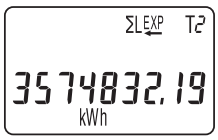
Page 2:
Total Active Imported Energy under T2 tariff



Page 3:
Total Active Exported Energy under T1 tariff



Page 4:
Total Active Exported Energy under T2 tariff



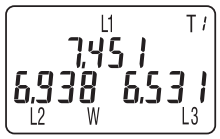
Page 5:
Total Reactive Imported Energy under T1 tariff

Page 6:
Total Reactive Imported Energy under T2 tariff

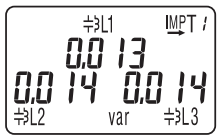
Page 7:
Total Reactive Exported Energy under T1 tariff

Page 8:
Total Reactive Exported Energy under T2 tariff

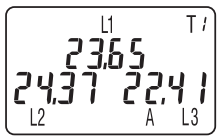
Page 9:
Phase Active Powers



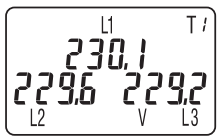
Page 10:
Phase Reactive Powers



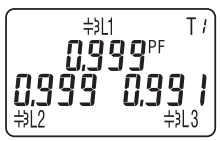
Page 11:
Phase Currents



Page 12:
Phase Voltages

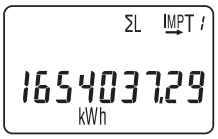


Page 13:
Phase Power Factors

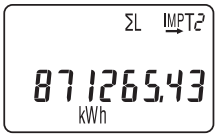


Version B - Main Menu Pages

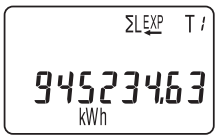
Page 1: Total Active Imported Energy under T1 tariff



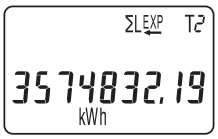
Page 2: Total Active Imported Energy under T2 tariff



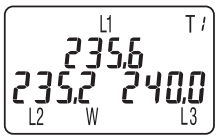
Page 3: Total Active Exported Energy under T1 tariff



Page 4: Total Active Exported Energy under T2 tariff

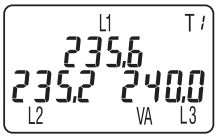


Page 5: Phase Active Powers

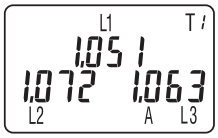


Page 6: Phase Reactive Powers

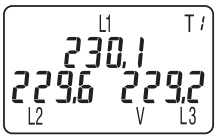
Page 7: Phase Apparent Powers



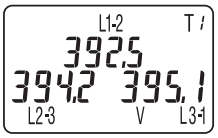
Page 8: Phase Currents



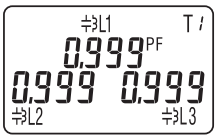
Page 9: Phase Voltages



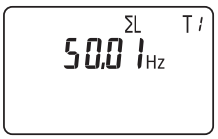
Page 10: System Voltages



Page 11: Phase Power Factors

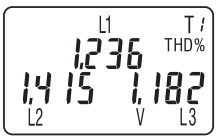


Page 12: Line Frequency

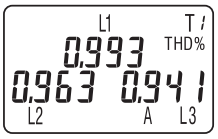


Page 13: Residual current

Page 14: Voltages THD%



Page 15: Currents THD%

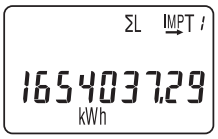


Real Time Clock Setting

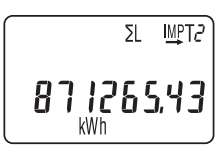
In order to mantain the date and time for some days in absence of the main power, a backed-up Real Time Clock is provided on-board. If the device is connected to Internet, the Real Time Clock is kept updated via SNTP. If an Internet connection is not available, the setting of the internal clock must be done manually at the startup and after shutdowns lasting more than two or three days. In this case it is strongly recommended to make the manual setting (preferably 5/10 minutes after switching on) to ensure the consistency of the historical graph storage and to avoid data loss.

Version C - Main Menu Pages

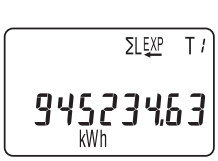
Page 1: Total Active Imported Energy under T1 tariff



Page 2: Total Active Imported Energy under T2 tariff

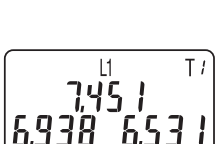


Page 3: Total Active Exported Energy under T1 tariff

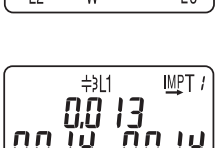


Page 4: Total Active Exported Energy under T2 tariff

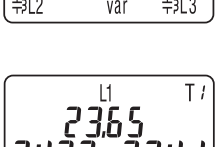
Page 5: Phase Active Powers



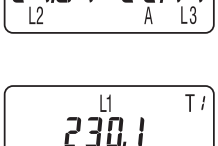
Page 6: Phase Reactive Powers



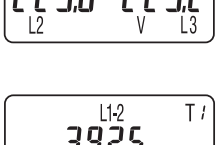
Page 7: Phase Currents



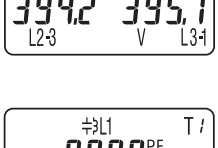
Page 8: Phase Voltages



Page 9: System Voltages

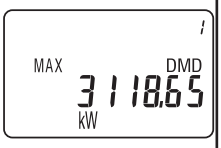


Page 10: Phase Power Factor

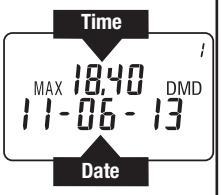


Maximum Demand Pages

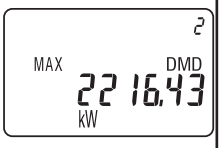
Page 11: Maximum Mean Power Value **1st Interval**



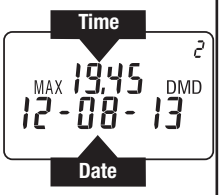
Page 12: **1st Interval** Timestamp



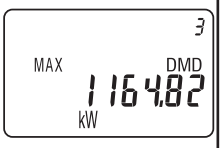
Page 13: Maximum Mean Power Value **2nd Interval**



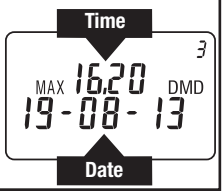
Page 14: **2nd Interval** Timestamp



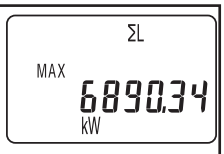
Page 15: Maximum Mean Power Value **3rd Interval**



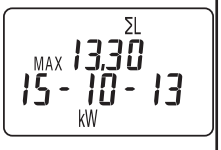
Page 16: **3rd Interval** Timestamp



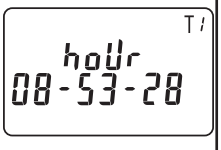
Page 17: Maximum Power (Peak) Power Value



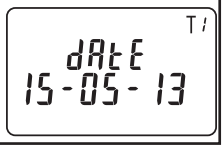
Page 18: Maximum Power (Peak) Time and date



Page 19: hh - mm - ss



Page 20: dd:mm:yy



CT Ratio Setting

The ratio set for CT affects the order of magnitude of the measured energies. Is the user's responsibility to ensure that this report is correct, the values of the energies eventually stored before a CT ratio change remain unaffected.

Service and Maintenance

It should not be necessary to recalibrate device during its lifetime as it is an electronic meter with no moving parts with electronics and voltage and current sensors that do not naturally degrade or change with time under specified environmental conditions. If a degradation in the performance is observed the device has probably been partly damaged and should be sent for repair or exchanged. If the meter is dirty and needs to be cleaned, use lightly moistened tissue with a water based mild detergent. Make sure no liquid goes into the meter as this could damage the meter.

A new generation Energy meter for a better and more efficient Energy use

With eVision is possible to have with you in each moment the consumption data of your house or office. Using some external split CT's, the installation of eVision don't need severe operations on the existing installations. The data can be checked everywhere using any internet browser for PC, Smartphone or Tablet, offering an immediate view of the house consumption. The historical backup allows to develop accurate analysis that can be consulted eVision. A new generation Energy meter for a better and more efficient Energy use. in a numeric or graphic format, obtaining an essential device for a better consumption habit. Home appliances, lights, air conditioner, heaters generators, swimming pool pumps and so on can now be managed in a more efficient way deciding use or tariff priorities, reducing in this way the costs of the bills and helping to preserve the environment.

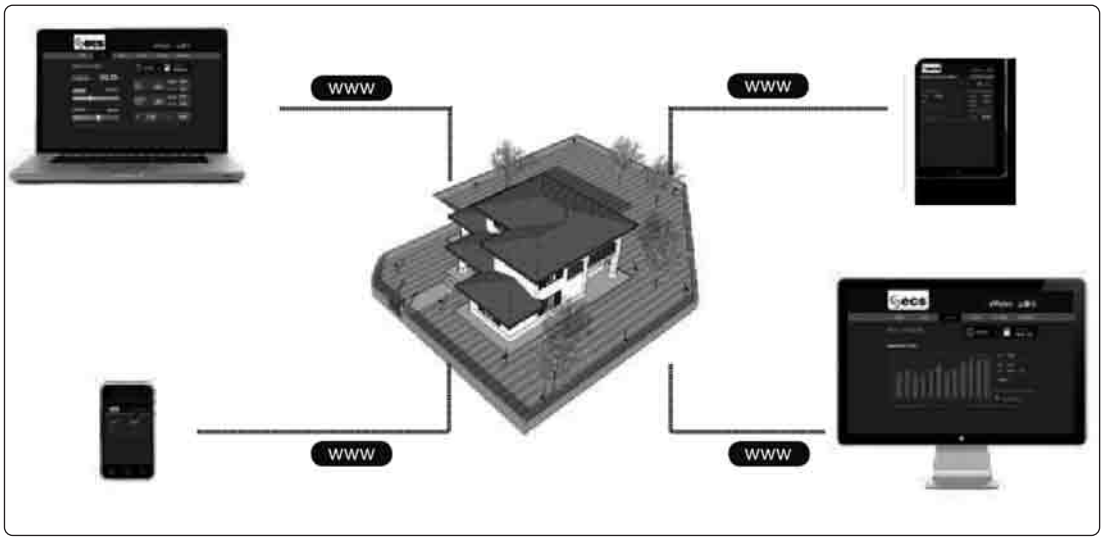
HOME:
Indication of the actual consumption and hour cost of your house or office.

COST:
Visualization of the month and day balance showed in your currency. Possibility to have the indication of generated Energy if there are solar panels or windmills.

GRAPH:
A clear and friendly indication of your consumption flow expressed in kWh or currency for day, week, month or year with the possibility to compare it with the previous ones.

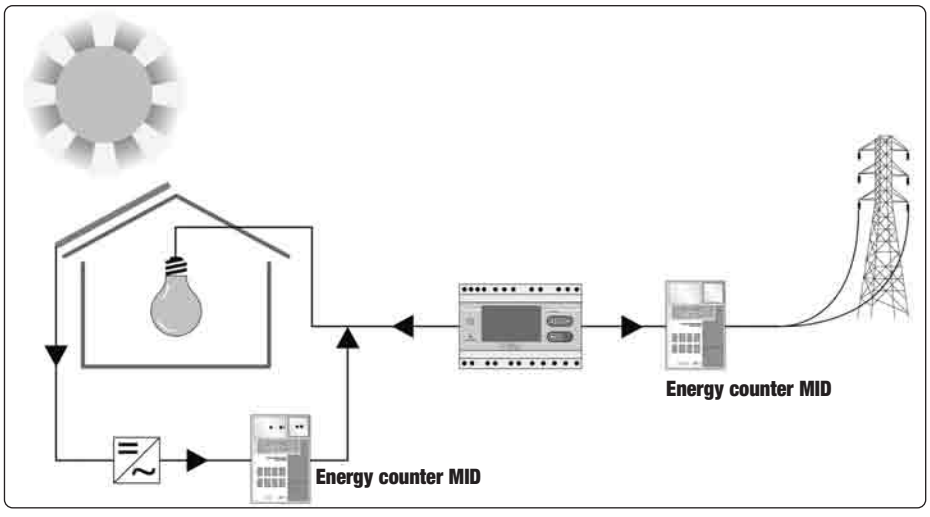
EVENTS:
Indication of the actual consumption and hour cost of your house or Possibility to set events. Once you will pass them, eVision will send you immediately an e-mail. You can receive also a day, week, month or year report whenever you wish..

SETTINGS:
Set the Low and High Tariff cost for import and export energies.



Consumptions and costs can be read directly from the display or via Internet in a more comfortable way.

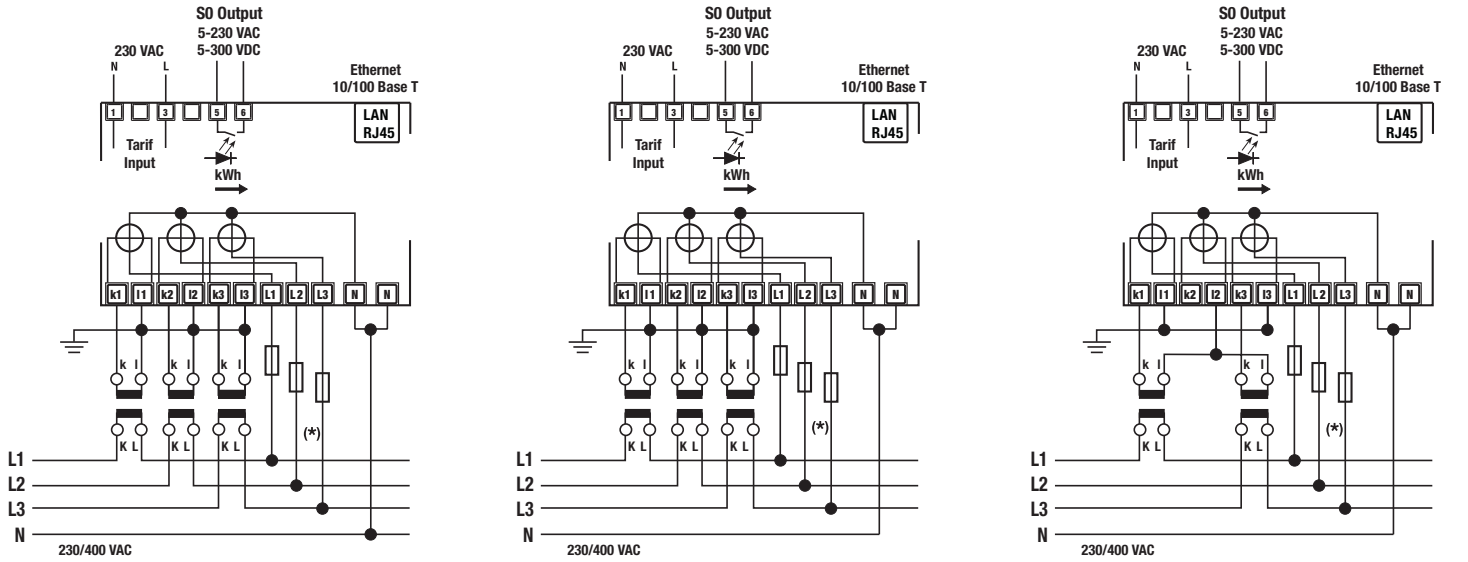
Example of a possible installation for import and export energies in a solar plant



eVison allows you to visualize with a simple click your actual, day, week, month and annual Energy consumption. Understand how and how much you are spending has never been so simple.
eVision is perfectly adaptable to a solar plant. It will indicate the quantity of generated and consumed Energy calculating automatically the cost or the earning of your house.

Wiring diagram

Connection through CT



"Neutral wire must be connected to the meter"

(*) A fuse (1A for ECSEM181 - 6A for ECSEM172) is reccomended for the line protection.

Instructions for the connection of transformer counters

Current transformers must not be operated with open terminals since dangerous high voltages might occur which may result in personal injuries and property damage. In addition to this, the transformers are exposed to thermal overload.

Earthing of secondary windings of CTs is governed by the laws in force in the Countries where the device is installed.

Technical Data for LAN-Server

Description

- TCP/IP data protocol
- HTTP for web
- Modbus/TCP (RTU) to access the measurement device database
- Static or DHCP based addressing
- Dynamic DNS to maintain a host name, accessible on the internet, without the need of a static IP
- Plug & Play technology
- Web browser user interface

Data and time

- eVision has a RTC to maintain date and time information
- The device is able to synchronize the time through NTP protocol

Data saving

- The measured data are saved internally for at least 10 years in a micro
- SD-Card with a 2 GB capacity

Operation features

- Data transfer speed ≤ 100 Mbit/s

LAN Interface

- HW interface: RJ45 connector
- SW protocol: TCP/IP
- Application protocols:
  HTTP - Modbus/TCP - FTP - SNTP - DHCP - DNS - DynDNS - SNMP

PC Application

- An installable PC application tool is available free of charge (downloadable from from H.C. website)

PC Application Feature

- Actual Power and progressive costs: reading Via Modbus TCP
- Stored DATA of energies: download Via FTP
- Energy consumption: periodic graphic processing
- Events: email address setting for alerts and reports
- Multi points: only an application instance for managing several eVision

LAN interface			
• HW interface	connector	-	RJ45
• SW interface		-	TCP/IP
Operating features			
• System start	automatic at power ON	-	-
• LAN data addressing	by means of its server IP	-	-
• Data transfer speed	LAN limited	Mbit/s	≤100
• Browser		-	IE7, IE8, Mozilla Firefox 3.09/3.5.3/3.6 Opera 9.64/10/10.5 Safari 3.2.2/4.0.5 Google Chrome 3.0.195.27

Technical Data for meter

Data in compliance with EN 50470-1, EN 50470-3, EN 62053-23 and EN 62053-31			**ECSEM181** **CT connection till 2.000/1 A** **inbuilt communication** **LAN**	**ECSEM172** **CT connection till 10.000/5 A** **inbuilt communication** **LAN**
General characteristics				
• Housing	DIN 43880	DIN	6 modules	6 modules
• Mounting	EN 60715	35 mm	DIN rail	DIN rail
• Depth		mm	70	70
Operating feature				
• Connectivity	to three-phase network	n° wires	4	4
• Storage of energy values and configuration	digital display (EEPROM)	-	yes	yes
• Display tariffs identifier	for active energy	n° 2	T1 and T2	T1 and T2
Supply				
• Operating voltage range		VAC	150 ... 260 / 276 ... 480	150 ... 260 / 276 ... 480
• Operating frequency range		Hz	48 ... 62	48 ... 62
• Rated power dissipation (max.) ***Pv***		VA (W)	≤8 (0.6)	≤8 (0.6)
Overload capability				
• Voltage ***Un***	continuous; phase/phase	VAC	480	480
	1 second: phase/phase	VAC	800	800
	continuous; phase/N	VAC	276	276
	1 second: phase/N	VAC	300	300
• Current ***Imax***	continuous	A	1.2	6
	momentary (0,5 s)	A	24	120
Display (readouts)				
• Connection errors and phase out	discernible from phase-sequence indic.	-	PHASE Err	PHASE Err
• Display type	LCD	n° digits	9	9
	digit dimensions	mm x mm	6.00 x 3	6.00 x 3
• Active energy: 1 display, 9 digit - 2 tariffs	min. measuring energy	kWh	0.01	0.01
+ display import or export (arrow)	max. measuring overflow	MWh	9999999.99	9999999.99
• Reactive energy: 1 display, 9 digit - 2 tariffs	min. measuring energy	kvarh	0.01	0.01
+ display import or export (arrow)	max. measuring overflow	Mvarh	9999999.99	9999999.99
• Instantaneous tariff measurement	1 display, 1-digit	-	T1 or T2	T1 or T2
• Transformer primary current		A	1 ... 2.000	5 ... 10.000
• Display period refresh		s	1	1
Measuring accuracy				
• Active energy and power	acc.to EN 50470-3	class	B	B
• Reactive energy and power	acc.to EN 62053-23	class	2	2
Measuring input				
• Type of connection		-	transformer .../1 A	transformer .../5 A
• Voltage ***Un***	phase/phase	VAC	400	400
	phase/N	VAC	230	230
• Operating range voltage	phase/phase	VAC	190 ... 480	190 ... 480
	phase/N	VAC	110 ... 276	110 ... 276
• Current ***Iref***		A	1	5
• Current ***Imin***		A	0.01	0.05
• Operating range current ***(Ist ... Imax)***	transformer connection (CT)	A	0.001 ... 1.2	0.003 ... 6
• Transformer current	primary current of the transformer	A	1 ...2.000	5 ...10.000
	smallest input step adjus. in 5 A steps	A	1	5
• Operating frequency		Hz	48 ... 62	48 ... 62
• Input waveform		-	AC	AC
• Starting current for energy measurement ***(Ist)***		mA	1	3
Pulse output S0	acc.to EN 62053-31			
• Pulse output	for active energy T1 and T2	-	yes	yes
• Pulse duration		ms	100	100
• Required voltage	min. ... max.	VAC (DC)	5 ... 230 ±5% (5 ... 300)	5 ... 230 ±5% (5 ... 300)
• Permissible current	pulse ON (max. 230 V AC/DC)	mA	90	90
• Permissible current	pulse OFF (leak. cur. max. 230 V AC/DC)	µA	1	1
Optical interfaces				
• Front side ***(accuracy control)***	LED	imp/kWh	50.000	10.000
Safety acc. to EN 50470-1				
• Indoor meter		-	yes	yes
• Degree of pollution		-	2	2
• Operational voltage		VAC	300	300
• AC voltage test (EN 50470-3, 7.2)		kV	4	4
• Impulse voltage test		1.2/50 µs-kV	6	6
• Protection class (EN 50470)		class	II	II
• Housing material flame resistance	UL 94	class	V0	V0
Connection terminals				
• Type cage main current paths	screw head Z +/-	POZIDRIV	PZ1	PZ1
• Type cage pulse output	blade for slotted screw	mm	0.8 x 3.5	0.8 x 3.5
• Terminal capacity main current paths	solid wire min. (max.)	mm^2	1 (4)	1 (4)
	stranded wire with sleeve min. (max.)	mm^2	1 (4)	1 (4)
• Terminal capacity pulse output	solid wire min. (max.)	mm^2	1 (4)	1 (4)
	stranded wire with sleeve min. (max.)	mm^2	1 (4)	1 (4)
Environmental conditions				
• Mechanical environment		-	M1	M1
• Electromagnetic environment		-	E2	E2
• Operating temperature		°C	-10 ... +55	-10 ... +55
• Limit temperature of transportation and storage		°C	-25 ... +70	-25 ... +70
• Relative humidity (not condensation)		%	≤80	≤80
• Vibrations	50 Hz sinusoidal vibration amplitude	mm	±0.075	±0.075
• Degree protection	housing when mounted in front (term.)	-	IP51(*)/IP20	IP51(*)/IP20

(*) **For the installation in a cabinet at least with IP51 protection.**